EDITORIAL ARTICLES.

THE TREATMENT OF COMPOUND FRACTURES OF THE SKULL.

The current number of *Volkmann's Sammlung klinischer Vorträge*[1] contains an elaborate contribution to the subject of compound fractures of the skull, with special regard to their treatment, by Dr. W. Wagner, of Königshütte, which appears worthy of special notice, not only for the reason that a large number of new cases is recorded, and that exceptionally good results have been achieved, but more especially on account of the author's divergence from the indications and mode of treatment heretofore generally accepted in compound injuries to the skull, and the attention given to the antiseptic method.

Thus the author. it will be seen, is not in favor of trephining for rupture of the middle meningeal artery, at least not in any but extreme cases of intracranial pressure; nor does he think it necessary to elevate smaller depressed pieces of skull; but if the slightest quantity of foreign matter, or as much as a hair have penetrated through a fissure in the skull, he deems it an unavoidable necessity to lay open the cranial cavity—a point which our readers will remember to have been insisted upon by Wiesman, of Zürich[2], in a recent contribution to the subject.

The cases, all treated from the same pointe of view and in the same hospital, the hospital for coal miners at Königshütte, during a period of nine years are 95 in number, and consist for the most part of severe injuries to the skull, such as miners are constantly exposed to. The greater majority were received into the hospital immediately or very soon after the injury, and the mortality percentage of these cases is 1.23. About one-seventh of the number, however, did not apply for treatment until at least twenty-four hours after the accident; and in this group the mortality averaged $33^1/_3$ per cent. The difference in these figures is due to antiseptic prophylaxis.

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[1] Nos. 271 and 272. Chirurg. No. 85. April 20, 1886.

[2] Vide Annals of Surgery. Vol. II. P. 502. Dec., 1885.

The author only cursorily considers the pathology and symptomatology of the subject, confining himself, as has been remarked, almost exclusively to the therapy of the injuries to the skull; and after giving quite a detailed review of the history of his subject, with special reference to the operation of trephining, he first considers the dangers of septic infections of skull-wounds. The smallest wound of the integument, when infected with septic matter, may lead to the most serious disturbance by the progress of the septic inflammation towards periostitis, purulent ostitis, osteo-phlebitis, meningitis, encephalitis; or the course of the infection may lead from periostitis through osteophlebitis to thrombosis of the venous sinuses and pyæmia. The dangers incident to septic infections increase as the injuries to the tissues penetrate more deeply.

If the peritoneum is severed, or if the bones of the skull are injured, the infectious matter is rapidly disseminated by means of the veins of the diploë, and infection of the brain and its tissues or pyæmic metastases result. If the cranial cavity is laid open, the septic infection leads to an inflammation of the dura mater, pachymeningitis externa, which may spread to the soft tissues enveloping the brain. But when the dura mater is injured as well, the danger for the patient is much enhanced by the immense susceptibility of the pia mater to septic infection.

A few hours suffice, in these latter cases, for the infection to gain a firm hold, so that nothing can stay the rapid development of inflammatory processes during the following days.

Erysipelas also plays an important part among such infections of scalp wounds, but does not materially differ as regards its prophylactic treatment from the other inflammatory processes.

Antiseptic prophylaxis, in fact, represents the key-note in the present treatment of all wounds and injuries to the skull, and should indicate what active therapeutic measures are to be chosen in each case.

Thorough cleansing of the injured parts and their immediate and more remote surroundings should be the first step in all cases without exception. This precaution is of the utmost importance as the scalp is always soiled by fatty substances, the secretions of the sebaceous and sudorific glands, and by dust and floating matter from the air.

Simple scrubbing with soap water and a brush is not sufficient. A better way is to first scrub the scalp with soap and carbolic (3%) or sublimate (1%) solution and then shave the parts surrounding the wound. The hair of the entire head is then to be washed by means of wads of cotton soaked in ether, turpentine or absolute alcohol, until all fatty substances have been removed. Then the scalp is to be cleaned with soap and warm water, and finally with an antiseptic solution. The wound is then to be examined. In case the bone or even the periosteum can be felt by means of the inserted finger, the wound is to be opened up, either with retractors, or if necessary by incision, and, after ligating all bleeding arteries and thoroughly cleansing the wound, the parts minutely inspected. It may be necessary to anæsthetise the patient before doing this.

The simplest case of compound fracture of the skull is injury to the external lamina, generally produced by sword cuts. Frequently fragments of this layer are met with, which should be completely removed, excepting in those cases where large continuous pieces of bone have been sliced off and are still connected with the skull by means of the periosteum. These latter fragments may be held in position by sutures, and drainage effected by perforating them. In other cases disinfection, evening off of the margins of the wound, exact suture, drainage and application of an antiseptic dressing suffices.

In case a penetrating fissure is found to exist, the treatment should vary according to whether foreign bodies, hairs, etc., have become impacted between the fragments or not, and whether the margins of the fissure are comminuted or soiled. If neither is the case the wound is to be closed as before; the patient should be kept in bed for at least three days, and calomel (0.25 gm. b. i. d.) administered. These dressings, which should include the whole head to the middle of the forehead and the chin, and should be so applied as to exert a certain pressure upon the wound, may be changed on the fourth day, when the drainage tubes are to be taken out; and again on the eighth in order to remove the sutures; they should not be completely left off until all parts have ceased to granulate, for fear of erysipelas.

In those cases, however, in which hairs or other bodies appear impacted in the fissures, they should at once be removed with the chisel and hammer.

Comminuted fragments of bone and soiled margins of fissures should be removed in the same way. But in case the fissure extends through the cranium for some distance under uninjured portions of the integument, no interference is necessary. Nor do slight differences in elevation of the fragments caused by depressions, indicate operative interference. Indeed, even fractures in which pieces of bone have been very appreciably depressed, by no means necessitate operative procedures, as long as no infection has taken place, although formerly such depressed pieces of bone formed indications for trephining. For the symptoms theoretically attributable to compression of the brain are in practice so confused with those of concussion and contusion of the brain, that the indications are not sufficiently clearly defined. The dangers of intracranial pressure are greatly exaggerated. The brain easily accustoms itself to depressed fragments, and can well bear the pressure of a moderate hæmorrhage from the middle meningeal arteries until the clot is absorbed. It is of far greater importance to prevent the infection of intracranial tissues than to relieve the brain from pressure; and it is this danger of infection arising from soiled wounds that may often demand operative interference. Entrance of foreign bodies into the wound, and injuries caused with unclean objects therefore indicate the use of the trephine or the chisel. Detached pieces of bone should be eliminated in order to anticipate a possible necrosis with prolonged suppuration. In cases where pointed instruments have penetrated through the bones of the skull, a sufficiently large piece of bone should be removed with the instrument to permit of perfect disinfection of the deeper injured parts. Septic infection can never be excluded with certainty, while an antiseptic operation may be done without incurring the least risk.

Extensive comminuted fractures are to be treated after the same principles as given above; nor should the presence of more alarming nervous symptoms referable to commotion and compression of the brain defer the surgeon from the conscientious exercise of antiseptic measures. Osseous fragments are to be extracted, the wound freely laid open, coagula of blood removed, foreign bodies extracted, unless such a procedure would necessitate injuries to the brain. Hæmorrhages occurring in the brain-substance should be stilled by means of the actual cautery. In case there is reason to fear an accumulation of blood beneath the dura, the latter should be incised. Elevation of large masses of depressed bone may be necessary in some very extensive compound fractures of parts of the skull, when the patient has escaped immediate death.

In the adjustment of the dressing care must be taken that the drainage tubes do not enter too far into the wound. The wound may be covered with the help of plastic methods.

The general treatment should be adapted to the general condition of the patient. In the stage of depression after concussion of the brain excitants should be given, subcutaneous injections of ether and camphor ordered, and sinapisms and hot packings be applied to the skin; the head laid low.

In the stage of excitation following, the head should be raised, an ice-bag applied to the head and a brisk cathartic administered. Intracranial pressure demands the same treatment. In both cases the application of leeches in the region of some emissary does excellent service. Of the action of ergotin the author has little experience. But the main importance should be attached to the local surgical treatment.

Special precautions are necessary when fracture of both walls of the frontal sinus has established direct communication between the nasal cavity and the brain tissues. In this case the effective application of an antiseptic dressing occluding the wound is rendered difficult of performance. The author advises tamponade of the frontal sinus with antiseptic gauze in all such cases, even though it should be necessary to enlarge the external wound and at the risk of establishing a frontal fistula—disadvantages which are of little consequence in comparison to the dangers of septic infection incurred by permitting free access of air to the cranial cavity. Absorption of the secretions by the gauze may cause artificial compression of the brain in these cases, a danger which should be borne in mind.

These considerations apply to other cavities situated in the immediate vicinity of the brain as well, and especially to the orbita and to the auditory meatus. Resection of a part of the orbital margin may become necessary in order to extract foreign bodies and to remove infectious matter. The auditory canal, after being cautiously cleansed by means of antiseptic solutions, may be filled with iodoform powder and loosely plugged with gauze. In cases of fracture of the ethmoid bone abundant dusting of the entire upper portion of the nasal cavity with iodoform is to be preferred to anterior and posterior tamponade. Iodoform inflation is also to be used in less recent cases when purulent secretions of the cavities mentioned have already appeared.

The author believes that his favorable results in cases of fracture of the base of the skull were entirely due to the adoption of this mode of treatment. For although many cases of fracture of the skull terminate fatally in the course of a few hours after the accident, in consequence of injuries affecting the central organs, and some of the author's cases took this course, yet, of all those who have survived the first 24 or 48 hours, and who were treated in the manner described, he subsequently lost not a single one—a result referable only to the antiseptic prophylactic treatment. The number of these cases amounts to twenty-three.

As to the treatment of less recent injuries to the skull, in which septic processes have already become established, it should not differ in principles from that of infected wounds situated in other parts.

For the purposes of disinfection the author uses an 8-per cent. solution of chloride of zinc and application of iodoform powder, after having cleaned the wound thoroughly with the help of a Volkmann's spoon, and incised all phlegmonous foci and recesses. Extensive phlegmons and erysipelatous inflammations of the scalp are treated with lotions containing acetate of alumina.

Inflammations of the intracranial tissues are not amenable to treatment; but if incipient forms of meningitis are to be treated, the author is in favor of thorough disinfection of all accessible parts, or at least of an attempt to do so, and even of trephining for this purpose, if there is any hope of rendering the focus of infection aseptic.

The cases accompanying the paper are many of them individually of the highest interest and will repay minute perusal; some of them are also made the subject of valuable, special and general remarks in the text.

Although the chief result of the paper will be to have given more prominence to the propriety of considering the chance introduction of foreign matter into fissures and wounds of the skull as an urgent indication for trephining, yet the position taken by the author in regard to the question of trephining for intracranial pressure is one of such special interest at the present moment, when there is a controversy being carried on, and traceable through periodical literature, relating to these very questions, that it must play a conspicuous part in deciding the battle.

Without here entering into a more detailed discussion of this latter subject, we would refer, besides to Wiesmann's, to Von Bergmann's and Kroenlein's more recent contributions to the subject.[1]

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[1] Vide ANNALS OF SURGERY, August 1886, p. 167; Sept. 1886, p. 232.

W. W. VAN ARSDALE.

ON THE CONTAGIOUSNESS OF LEPROSY.

The question whether leprosy be contagious has been much discussed recently at the Academy of Medicine of Paris. The theory of contagion has its partisans and its opponents, and the latter seem to be in the majority in that learned assembly. It may not be without interest to publish the results of researches on the subject undertaken in the Sandwich Islands, Mauritius and Réunion, as well as in British Guiana. These have recently been summarized in an interesting contribution to the *Progrès Médicale*, by Dr. R. Suzor, of Mauritius and from which we shall freely quote.

It is of secondary importance to know if leprosy existed in the Sandwich Islands prior to 1848, if M. Quoy has seen it there in 1819. The fact remains that at any rate the disease was exceedingly rare in 1848. At about that time commenced the immigration of the Chinese, and amongst them the presence of leprosy was recognized. Ten years later, in 1858, the disease was for the first time mentioned as common in the country. Either it did not exist before the arrival of the Chinese, and therefore it was they who introduced it; or, if it did exist before their time, how can we explain the extreme slowness of its development before their arrival and its sudden extension in the following ten years to such an extent that a tenth of the population became lepers? If the latter hypothesis be true, it reminds us forcibly of the case of Europe in the Middle Ages. Leprosy existed, but it was comparatively rare. The Crusaders, while in the East, went into the ancient homes of the scourge, and shortly after their return to their own country the disease became so prevalent that people talked of epidemics of leprosy, and in France alone more than 2,000 leper-houses were established to isolate the sick. Another fact is to be noted, that wherever isolation has been stringent the number of the affected has rapidly diminished. It is the inverse of what has passed at the Sandwich Islands, and the two facts seem to militate in favor of the idea of contagion.

Mauritius and Réunion until the 17th century were uninhabited, and the first colonists permanently established were French. Then came immigrations of Africans, Hindoos and lastly Chinese. At the present time hundreds of lepers can be counted without difficulty, of all races, even Europeans. Now it is proved that several lepers have landed there, coming from Africa or Asia as slaves or as coolie laborers. In British Guiana the history of leprosy is still clearer and more interesting. 1st period, prehistoric. The country was inhabited exclusively by Indian tribes. 2d period: European colonies established. No leprosy. 3d period. Slavery. Among the African slaves who were landed there a few were attacked with leprosy. They were rigorously isolated on the confines of the plantations, and the cases all remained limited to the blacks. In 1831 there were altogether 431; and a special establishment was founded on the banks of the river Pomeroon, where they were all sent, But at this spot there were already established several tribes of Indians—Carribs, Accoways, Arrowacks, Warrows, etc. Disliking their new neighbors they all left the district except the Warrow tribe, who fraternized and had intimate relations with the lepers. In 1842 McClintock wrote: "We have taken a census of the whole Indian population. We have met with a great number of lepers of both sexes, but all invariably belonged to the Warrow tribe". This points to contagion. The Bovianders, hybrids of Negroes and Warrow Indians, are also frequently the subject of leprosy. This points to heredity.

In 1838 came the emancipation of the slaves, who spread themselves all over the colony, going wherever it seemed best for them and mixing freely with the general population. At about the same time the planters imported coolies from China and India, and among these, as usual, lepers were sometimes found. To-day there are two lepers per thousand of the population, and the whites and mulattoes furnish their contingent to, the disease as well as the Negroes and Indians.

Some cases may be cited:

1. Cases of Dr. Regnauld, observed at Mauritius.

(a). A black woman, a widow with a child æt. 5 by her first husband, married again a man suffering from leprosy. The latter fondled the child a great deal and they were constantly together. The disease soon appeared in the child. There was no trace of hereditary leprosy in the woman or in her former husband.

(b). A white man acquired anæsthetic leprosy with ulcers. His wife assisted the doctor every day in the dressing. She was probably less careful in afterwards washing her hands. At any rate, a month after the death of her husband, a leprous spot developed on the right cheek, and two months later she was everywhere covered,and the disease grew worse.

A great many cases of this kind could be cited. Simple coincidences, they may be called, but in this case we should have to say that " the exceptions are more numerous than the rule."

2. A young Scotchman, born in Scotland, of parents who had never

left Europe and whose hereditary history was in every respect perfect, arrived at Guiana. One night, being drunk he had connection with a woman, whom he found to his horror the next day to be a confirmed leper. Ten months later he developed the first symptoms of leprosy, of which he died. (Drs. Manget, Edge, Watt).

The author knows several other similar cases, one of which was in his care.

. Joseph Francis C., æt. 20, Portuguese, white, born in Demarara, his parents still living and healthy. Ten years ago he was attacked by leprosy, the tuberculous form like the preceding. A sister, æt. 18, is also leprous. They were both vaccinated with lymph taken from an infant belonging to a leprous family. Their brother and three sisters, who were not vaccinated from the same source, are perfectly well.

The Drs. Manget, Army Surg. Gen'l., and Hillis, Physician to the Lepers' Asylum of British Guiana, who personally knew this family, consider the facts as absolute proof of the propagation of the disease by vaccination. It would be easy to quote others.

The cases of hereditary leprosy are numerous. Let it suffice to cite the works of Boek, Danielson, Carter, Hillis, etc. Here are a few facts borrowed from the last author.

(a). J. L'Esperance, confirmed leper at 2 years. Mixed form of the disease. Father and mother both leprous, the father having the tuberculous variety, the mother the anæsthetic. The mixed form usually only develops between the ages of 20 and 40 years.

(b). Marie B., æt. 43. Parents leprous. She herself still free from any manifestation of the disease, but she has six children from 10 months old to 14 years—all with tuberculous leprosy—which generally does not appear till after puberty.

(c). Dr. Saturnin (Trinidad) and the committee of the R. Col. of Physicians, of London, quote two cases of leprosy in the new born.

These facts without answering the requirements of Kaposi's eminent annotators, who desired to see a child born in Paris, of a leprous mother, and being immediately separated from her, afterwards becoming leprous, appear to us to shake somewhat the position of the adversaries of the hereditary transmission of the disease. How shall an affection, which is propagated by heredity, by contact, by sexual intercourse, by vaccination, which shows itself most often on the uncovered part of the body, which takes on the skin a serpiginous course, be considered contagious or not? The same question might be as well asked with regard to syphilis, which is far from being contagious in all its stages, and which does always produce its hereditary character.

Finally it will be possible, we hope, to take up the experimental study of the question. For some time we have been trying the cultivation of the bacillus of leprosy in human blood. If pure cultivations are obtained, we shall have the opportunity of renewing the tentative inoculations by Neisser. It will also be interesting to study the bacillus of tubercle in this new medium.

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